

The Directed Shark Longline Fishery:
Catch and Bycatch, 2005

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Introduction

The shark bottom longline fishery is active in the Atlantic Ocean from about the Mid-Atlantic Bight to south Florida and throughout the Gulf of Mexico. Vessels in the fishery are typically fiberglass and average 50 feet in length. Longline characteristics vary regionally with gear normally consisting of about 5-15 miles of longline and 500-1500 hooks. Gear is set at sunset and allowed to soak overnight before hauling back in the morning. There are currently about 100 active vessels in this fishery out of about 250 vessels that possess directed shark fishing permits. These vessels make between 4000-9000 sets per year. The bottom longline gear targets large coastal sharks, but small coastal sharks, pelagic sharks, and dogfish species are also caught.

Observations of the Atlantic shark directed bottom longline fishery have been conducted since 1994 (Burgess and Morgan, 2003 and references therein). From 1994 through 2001, observer coverage was conducted on a voluntary basis. Beginning with the 2002 fishing season, observer coverage of the Atlantic shark directed bottom longline fishery became mandatory under authority of 50 CFR 635.7. Observer coverage from 1994 through the 1st trimester season of 2005 was coordinated by the Commercial Shark Fishery Observer Program (CSFOP), Florida Museum of Natural History, University of Florida, Gainesville, FL (Burgess and Morgan, 2003).

Observer coverage for this fishery is required under the current federal management plan for highly migratory species (NMFS, 2003). Starting with the 2nd trimester season of 2005, responsibility for the fishery observer program was transferred to National Marine Fisheries Service (NMFS), Southeast Fisheries Science Center (SEFSC), Panama City Laboratory. The objectives of this report are to document catch, bycatch, and protected species bycatch in the Atlantic shark directed bottom longline fishery for the 2nd and 3rd trimester fishing seasons of 2005.

Methods

Observer Protocol

Vessels were randomly selected from a pool of vessels each trimester season based on the following criteria: (1) the vessel/owner must possess a current directed shark permit, (2) the permit holder (i.e. vessel/owner) must have reported fishing for sharks with bottom longline gear in the second season of 2004, (3) the permit holder must have reported greater than 25 percent of landings from sharks during that season and (4) the permit holder must not have been selected for observer coverage for the prior three consecutive shark seasons. Vessels were selected from three fishing regions: North Atlantic, South Atlantic, and Gulf of Mexico. The North Atlantic is defined as from Virginia to Maine, the South Atlantic is defined as the east coast of Florida to North Carolina and the Caribbean, and the Gulf of Mexico is defined as Texas to west coast of Florida including the Florida Keys (NMFS, 2005).

Selection letters requiring observer coverage were issued to the permit holder via U.S. Certified mail approximately one month prior to the upcoming fishing season. Each selection letter is mailed with a trip notification form that,

when returned prior to a trip, provides the observer coordinator with written information concerning the vessel's name, captain, contact persons and phone numbers, communications and safety equipment available aboard the vessel, and information about the vessel's location, dates, and times of departure and return. The form is also used to inform the observer coordinator when a vessel is active in another fishery, under repair, or no longer fishing. The written notification is necessary to document the permit holder's efforts to comply with mandatory coverage. Telephone calls are helpful, after written notification, to determine other specific details prior to the deployment of the observer to meet the vessel.

Once the permit holder receives the selection letter, he or she is required to make contact with the observer coordinator and indicate intent to fish during the upcoming fishing season. Upon indication to fish, the observer coordinator deploys an observer to the permit holder vessel's reported port of departure. The observer is deployed generally 24-48 hours prior to the time the vessel plans to leave port. According to the Observer Health and Safety Regulations (50 CFR 600), all vessels selected for coverage must possess a current US Coast Guard safety examination decal. If the vessel does not possess a current decal, it is not permitted for the vessel to carry an observer and is thus prohibited to fish for the time period it has been selected for observer coverage.

For consistency among longline observer programs throughout the Southeast Fisheries Science Center, we adopted the methods outlined for the Pelagic Longline Observer Program (Beerkircher et al., 2004). While onboard the vessel, the observer completes three data forms: Longline Gear Characteristic Log, Longline Haul Log, and Individual Animal Log. The Longline Gear Characteristic Log is used to record, for example, the type and length of the mainline used, number and length of gangions, and make and model of hooks used. The Longline Haul Log is used to record the length, location, and time duration for each set and haulback, as well as environmental information and the type(s) of bait used. The Individual Animal Log records all species caught, condition of the catch (e.g. alive, dead, damaged, or unknown) when brought to the vessel, and the final disposition of the catch (e.g. kept, released, finned, etc.). When an animal is brought onboard the vessel, the observer records the species identification, sex (sharks only) and length information. In the event a protected resource (i.e. sea turtle or marine mammal) is encountered, the observer is also required to fill out additional sea turtle or marine mammal forms. Copies of these forms are available at: <http://www.sefsc.noaa.gov/seaturtlefisheriesobservers.jsp>. If any species identification is questionable, the observer is instructed to take several digital pictures of the specimen in question for further review by SEFSC staff. Data from each trip are submitted to SEFSC staff on a per trip basis. The data are entered and reviewed by SEFSC staff and reviewed with observer contract staff to resolve any questions.

Results and Discussion

From 2002-2005, the objective of vessel selection was to achieve a representative 5% level of coverage of the total fishing effort in each fishing area and during each fishing season of that year (Chris Rilling, NMFS Office of

Sustainable Fisheries, pers. comm.). Due to the need to attain a 5% coverage level for each season and area, permit holders could be selected for observer coverage multiple times a year. Beginning in 2006, target coverage level will be 3.9% of the total fishing effort. This level is estimated to attain a sample size needed to provide estimates of sea turtle, smalltooth sawfish, or marine mammal interactions with an expected coefficient of variation of 0.3 (Carlson, unpublished).

Overall, shark bottom longline observer program (SBLOP) observers spent 117 days at sea on 35 trips for the 2nd and 3rd trimester seasons, 2005. There was some difficulty in placing observers on vessels especially in the western Gulf of Mexico due to Hurricanes Dennis, Katrina, Rita, and Wilma. Observers monitored 19 vessels and recorded information for 92 sets. Observer coverage was obtained in the South Atlantic and Gulf of Mexico fishing regions. Distribution of all observed sets is illustrated in Figure 1.

South Atlantic fishery

A total of 10 vessels were observed on 22 trips (average trip length was 2 days) making 46 sets in the South Atlantic region. The majority of these sets were bottom longline sets directing towards sharks (67.4%), but 23.9% targeted tilefish, *Lopholatilus sp.*, using bottom longline gear and 8.7% of sets were pelagic (i.e. the longline is set near the surface using floats) directing towards sharks. For all sets, the length of mainline ranged from 2.8-35.2 km with an average of 17.4 km (± 9.8 S.D.). Number of hooks deployed ranged from 86-1270 with an average of 699 (± 296 S.D.). Hooks were fished in seawater depths from 5.5-272.5 m averaging 89.6 m (± 80.5 S.D.). Setting of gear averaged 1.5 hrs (± 0.64 S.D.) while gear haul back averaged 4.0 hrs (± 1.9 S.D.). The gear was soaked (time gear was set minus time haul back began) an average of 8.6 hrs (± 6.5 S.D.). Vessels fished circle hooks, J-hooks, or a combination of circle and J-hooks. Circle hook sizes used include 14/0, 16/0, 18/0, and 20/0 with size 18/0 fished 67% of the time when sharks were the target species. J-hook sizes included 12/0, 14/0, and 16/0.

Observed South Atlantic catches

The observed South Atlantic bottom longline catches consisted of 19 species of sharks, 21 species of teleosts, 5 species of batoids, and 3 species of invertebrates (Table 1). Total observed catch composition (percent of numbers caught) was 77.9% sharks, 19.8% teleosts, 2.1% rays, and 0.1% invertebrates. Four species of sharks made up 88.6% (by number) of the observed shark catch. These species were sandbar shark, *Carcharhinus plumbeus*, tiger shark *Galeocerdo cuvier*, Atlantic sharpnose shark, *Rhizoprionodon terraenovae*, and blacktip shark, *C. limbatus*. Two species of teleosts made up 84.3% by number of the overall non-shark species. These species were the tilefish, *Lopholatilus chamaeleonticeps*, and the southern hake, *Urophycis floridana*.

Average size

Observers measured 83.2% of the total catch of sharks. The only species for which no measurements could be taken were bonnethead and sand tiger shark. Average sizes based on these measurements are found in Table 2.

Protected species interactions

Interactions with protected resources were observed for vessels fishing in the South Atlantic region with bottom longline gear in 2005 (Table 3). One (1) leatherback sea turtle *Dermochelys coriacea* and one (1) loggerhead sea turtle *Caretta caretta* were observed caught in bottom longline gear and were both released dead. Two (2) smalltooth sawfish *Pristis pectinata* were also caught in bottom longline gear and both were released alive (Table 3). No sea birds or marine mammal interactions were observed.

Gulf of Mexico fishery

A total of 9 vessels were observed on 13 trips (average trip=5 days) making 46 sets in the Gulf of Mexico region. All sets utilized bottom longline gear with 87% targeting sharks and 13% targeting a combination of sharks and groupers (within the same set). The length of mainline set ranged from 3.7-28.9 km with an average of 14.3 km (± 5.7 S.D.). Number of hooks set ranged from 177-895, with an average of 441 hooks (± 177 S.D.) per set. Hooks were fished at a depth range of 9.1-120.7 m with an average depth of 40.2 m (± 18.3 S.D.). Setting of gear averaged 1.5 hrs (± 0.6 S.D.), while gear haul back averaged 3.3 hrs (± 1.6 S.D.). The gear was soaked an average of 8.5 hrs (± 4.1 S.D.). The majority of longline vessels utilized circle hooks (67%) but some (33%) used a combination of circle and J-hooks. Circle hook sizes used included 13/0, 14/0, 16/0 (most common), and 18/0. J-hook sizes included 12/0 and 16/0.

Observed Gulf of Mexico catches

The observed Gulf of Mexico bottom longline catches consisted of 17 species of sharks, 14 species of teleosts, 1 species of batoid, and 7 species of invertebrates (Table 4). Total observed catch composition (percent of numbers caught) was 83.1% sharks, 16.1% teleosts, 0.1% rays, and 0.7% invertebrates. Five species of shark made up 84.9% (by number) of the observed shark catch. These species were the blacktip shark, blacknose shark *C. acronotus*, sandbar shark, nurse shark *Ginglymostoma cirratum*, and the Atlantic sharpnose shark. One species of teleost (red grouper *Epinephelus morio*) made up 86.6% by number of the overall non-shark species.

Average size

Observers measured 65.2% of the total catch of sharks. The only species for which no measurements were taken was the nurse shark. Average sizes based on these measurements are found in Table 5.

Protected species interactions

Interactions with protected resources were observed for vessels fishing in the Gulf of Mexico with bottom longline gear in 2005 (Table 6). Three (3) loggerhead sea turtles were observed caught in bottom longline gear. One (1) loggerhead sea turtle was released alive, one (1) loggerhead sea turtle was released dead, and one (1) loggerhead sea turtle was released in an unknown condition. No smalltooth sawfish, sea birds, or marine mammal interactions were observed (Table 6).

References

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- National Marine Fisheries Service (NMFS). 2003. Final Amendment 1 to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks. Office of Sustainable Fisheries. Highly Migratory Species Management Division, Silver Spring, Maryland.
- National Marine Fisheries Service (NMFS). 2005. 2005 Guide for complying with the regulations for Atlantic Tunas, Swordfish, Sharks, and Billfish, 39 p.

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Table 1. Total observed South Atlantic catch and bycatch by species and species disposition in order of decreasing abundance for all observed trips, 2005.

Species	Common Name	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)	Un- known (%)
<i>Carcharhinus plumbeus</i>	sandbar shark	846	98.6	0.0	0.2	1.2
<i>Galeocerdo cuvier</i>	tiger shark	766	30.3	63.3	3.8	2.6
<i>Lopholatilus chamaeleonticeps</i>	tilefish	463	97.8	0.6	0.0	0.4
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	384	59.1	1.3	39.6	0.0
<i>Carcharhinus limbatus</i>	blacktip shark	178	98.3	0.0	1.1	0.6
<i>Ginglymostoma cirratum</i>	nurse shark	71	1.4	97.2	1.4	0.0
<i>Carcharhinus acronotus</i>	blacknose shark	63	90.5	3.2	6.3	0.0
<i>Urophycis floridana</i>	southern hake	62	14.5	54.8	29.0	0.0
Rajiformes	batoid order	38	0.0	97.4	2.6	0.0
<i>Epinephelus morio</i>	red grouper	31	74.2	3.2	19.4	3.2
<i>Sphyrna lewini</i>	scalloped hammerhead	27	92.6	7.4	0.0	0.0
<i>Carcharhinus obscurus</i>	dusky shark	23	4.3	52.2	43.5	0.0
<i>Negaprion brevirostris</i>	lemon shark	21	100.0	0.0	0.0	0.0
<i>Raja eglanteria</i>	clearnose skate	16	0.0	93.8	6.3	0.0
<i>Carcharias taurus</i>	sand tiger shark	14	0.0	100.0	0.0	0.0
<i>Lutjanus analis</i>	mutton snapper	14	85.7	0.0	14.3	0.0
<i>Carcharhinus brevipinna</i>	spinner shark	13	100.0	0.0	0.0	0.0
<i>Sphyrna mokarran</i>	great hammerhead shark	11	90.9	0.0	0.0	9.1
<i>Carcharhinus perezi</i>	Caribbean reef shark	11	90.9	9.1	0.0	0.0
Dasyatidae	stingray family	11	0.0	90.9	0.0	9.1
<i>Carcharhinus leucas</i>	bull shark	10	90.0	10.0	0.0	0.0
<i>Carcharhinus falciformis</i>	silky shark	9	88.9	0.0	11.1	0.0
Muraenidae	moray eel family	9	11.1	44.4	33.3	0.0
<i>Mycteroperca microlepis</i>	gag	7	100.0	0.0	0.0	0.0
Anguilliformes	eel order	7	28.6	71.4	0.0	0.0
<i>Mycteroperca bonaci</i>	black grouper	6	100.0	0.0	0.0	0.0
<i>Carcharhinus signatus</i>	night shark	4	50.0	50.0	0.0	0.0
<i>Rachycentron canadum</i>	cobia	4	100.0	0.0	0.0	0.0
<i>Sphyrna barracuda</i>	great barracuda	4	100.0	0.0	0.0	0.0
<i>Bagre marinus</i>	gafftopsail catfish	3	100.0	0.0	0.0	0.0
<i>Carcharhinus isodon</i>	finetooth shark	2	100.0	0.0	0.0	0.0
<i>Epinephelus niveatus</i>	snowy grouper	2	100.0	0.0	0.0	0.0
<i>Epinephelus flavolimbatus</i>	yellowedge grouper	2	100.0	0.0	0.0	0.0
Carangidae	amberjack family	2	100.0	0.0	0.0	0.0
<i>Cancer borealis</i>	Jonah crab	2	0	100	0	0
Asteroidea	starfish	2	0	100	0	0
<i>Sphyrna tiburo</i>	bonnethead shark	1	0.0	0.0	100.0	0.0
<i>Sphyrna zygaena</i>	smooth hammerhead shark	1	100.0	0.0	0.0	0.0
<i>Seriola rivoliana</i>	almaco jack	1	0.0	0.0	100.0	0.0
<i>Mycteroperca phenax</i>	scamp	1	100.0	0.0	0.0	0.0

Table 1. continued

Species	Common Name	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)	Unknown (%)
<i>Ophichthus ocellatus</i>	pale-spotted eel	1	0.0	0.0	100.0	0.0
<i>Aetobatis narinari</i>	spotted eagle ray	1	0.0	100.0	0.0	0.0
<i>Dasyatis americana</i>	outhern stingray	1	0.0	100.0	0.0	0.0
<i>Epinephelus nigritus</i>	Warsaw grouper	1	100.0	0.0	0.0	0.0
<i>Thunnus albacares</i>	yellowfin tuna	1	0.0	0.0	100.0	0.0
Batrachoididae	toadfish family	1	0.0	100.0	0.0	0.0
Lutjanidae	snapper family	1	100.0	0.0	0.0	0.0

Table 2. Average size of sharks measured by number measured for all observed South Atlantic longline trips, 2005. N=the number of measured sharks, FL=straight fork length, SD=standard deviation.

Species	Common name	N	Average Size (cm FL)	S.D.	Percent Measured (%)
<i>Carcharhinus plumbeus</i>	sandbar shark	846	150.4	14.2	96.1
<i>Galeocerdo cuvier</i>	tiger shark	766	111.9	26.2	82.1
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	384	78.4	9.6	75.0
<i>Carcharhinus limbatus</i>	blacktip shark	178	123.7	17.0	82.6
<i>Ginglymostoma cirratum</i>	nurse shark	71	166.0	26.9	4.2
<i>Carcharhinus acronotus</i>	blacknose shark	63	98.2	14.9	95.2
<i>Sphyrna lewini</i>	scalloped hammerhead shark	27	159.4	30.0	66.7
<i>Carcharhinus obscurus</i>	dusky shark	23	120.9	42.9	60.9
<i>Negaprion brevirostris</i>	lemon shark	21	207.4	19.4	71.4
<i>Carcharias taurus</i>	sand tiger shark	14	0.0	0.0	0.0
<i>Carcharhinus brevipinna</i>	spinner shark	13	135.7	20.0	100.0
<i>Carcharhinus perezi</i>	Caribbean reef shark	11	136.8	16.7	90.9
<i>Sphyrna mokarran</i>	great hammerhead shark	11	231.7	13.3	81.8
<i>Carcharhinus leucas</i>	bull shark	10	199.2	30.4	90.0
<i>Carcharhinus falciformis</i>	silky shark	9	133.3	63.9	88.9
<i>Carcharhinus signatus</i>	night shark	4	144.2	50.6	100.0
<i>Carcharhinus isodon</i>	finetooth shark	2	107.0	4.2	100.0
<i>Sphyrna tiburo</i>	bonnethead shark	1	-	-	0.0
<i>Sphyrna zygaena</i>	smooth hammerhead shark	1	168.0	0.0	100.0

Table 3. Total South Atlantic bottom longline incidental catch by species and species disposition in order of decreasing abundance for all observed trips, 2005.

Species	Common Name	Total Number Caught	Discard Alive (%)	Discard Dead (%)	Unknown (%)
<i>Pristis pectinata</i>	smalltooth sawfish	2	100.0	0	0
<i>Caretta caretta</i>	loggerhead turtle	1	0	100.0	0
<i>Dermochelys coriacea</i>	leatherback turtle	1	0	100.0	0

Table 4. Total observed Gulf of Mexico catch and bycatch by species and species disposition in order of decreasing abundance for all observed trips, 2005.

Species	Common Name	Total Number Caught	Kept (%)	Discard Alive (%)	Discard Dead (%)	Un- known (%)
<i>Carcharhinus acronotus</i>	blacknose shark	259	78.0	1.9	19.3	0.8
<i>Carcharhinus limbatus</i>	blacktip shark	259	97.3	0.0	1.2	1.5
<i>Epinephelus morio</i>	red grouper	219	29.7	58.4	11.4	0.5
<i>Carcharhinus plumbeus</i>	sandbar shark	218	98.6	0.0	0.0	1.4
<i>Rhizoprionodon terranova</i>	Atlantic sharpnose shark	189	78.3	0.5	21.2	0.0
<i>Ginglymostoma cirratum</i>	nurse shark	187	0.5	98.9	0.5	0.0
<i>Galeocerdo cuvier</i>	tiger shark	64	39.1	46.9	10.9	3.1
<i>Negaprion brevirostris</i>	lemon shark	31	90.3	0.0	3.2	6.5
<i>Carcharhinus brevipinna</i>	spinner shark	31	96.8	0.0	0.0	3.2
<i>Carcharhinus leucas</i>	bull shark	24	79.2	0.0	0.0	20.8
<i>Carcharhinus falciformis</i>	silky shark	20	95.0	5.0	0.0	0.0
<i>Sphyrna mokarran</i>	great hammerhead shark	12	100.0	0.0	0.0	0.0
<i>Mycteroperca microlepis</i>	gag	8	75.0	0.0	25.0	0.0
<i>Echeneis naucrates</i>	sharksucker	7	14.3	85.7	0.0	0.0
<i>Mustelus canis</i>	smooth dogfish shark	5	0.0	20.0	80.0	0.0
<i>Epinephelus itajara</i>	goliath grouper	5	0.0	80.0	20.0	0.0
Porifera	sponge	5	0	100	0	0
<i>Sphyrna lewini</i>	scalloped hammerhead shark	4	75.0	0.0	0.0	25.0
<i>Calamus bajonado</i>	jolthead porgy	4	100.0	0.0	0.0	0.0
Anthozoa	coral	4	0	75	25	0
<i>Carcharhinus obscurus</i>	dusky shark	2	0.0	0.0	100.0	0.0
<i>Mycteroperca bonaci</i>	black grouper	2	0.0	50.0	50.0	0.0
<i>Rachycentron canadum</i>	cobia	2	50.0	50.0	0.0	0.0
<i>Eleganyis bipinnulata</i>	rainbow runner	2	100.0	0.0	0.0	0.0
<i>Opsanus beta</i>	gulf toadfish	2	50.0	0.0	50.0	0.0
<i>Calappa flammea</i>	flame box crab	2	0	100	0	0
<i>Sphyrna tiburo</i>	bonnethead shark	1	100.0	0.0	0.0	0.0
Sphyrnidae	hammerhead shark family	1	0.0	0.0	100.0	0.0
Carcharhiniformes	shark order	1	0.0	100.0	0.0	0.0
<i>Seriola fasciata</i>	lesser amberjack	1	100.0	0.0	0.0	0.0
<i>Diplectrum formosum</i>	sand perch	1	0.0	0.0	100.0	0.0
<i>Sciaenops ocellatus</i>	red drum	1	0.0	100.0	0.0	0.0
<i>Seriola zonata</i>	banded rudderfish	1	100.0	0.0	0.0	0.0
<i>Epinephelus drummondhayi</i>	speckled hind	1	0.0	100.0	0.0	0.0
<i>Lutjanus griseus</i>	gray snapper	1	100.0	0.0	0.0	0.0
<i>Aetobatis narinari</i>	spotted eagle ray	1	0.0	100.0	0.0	0.0

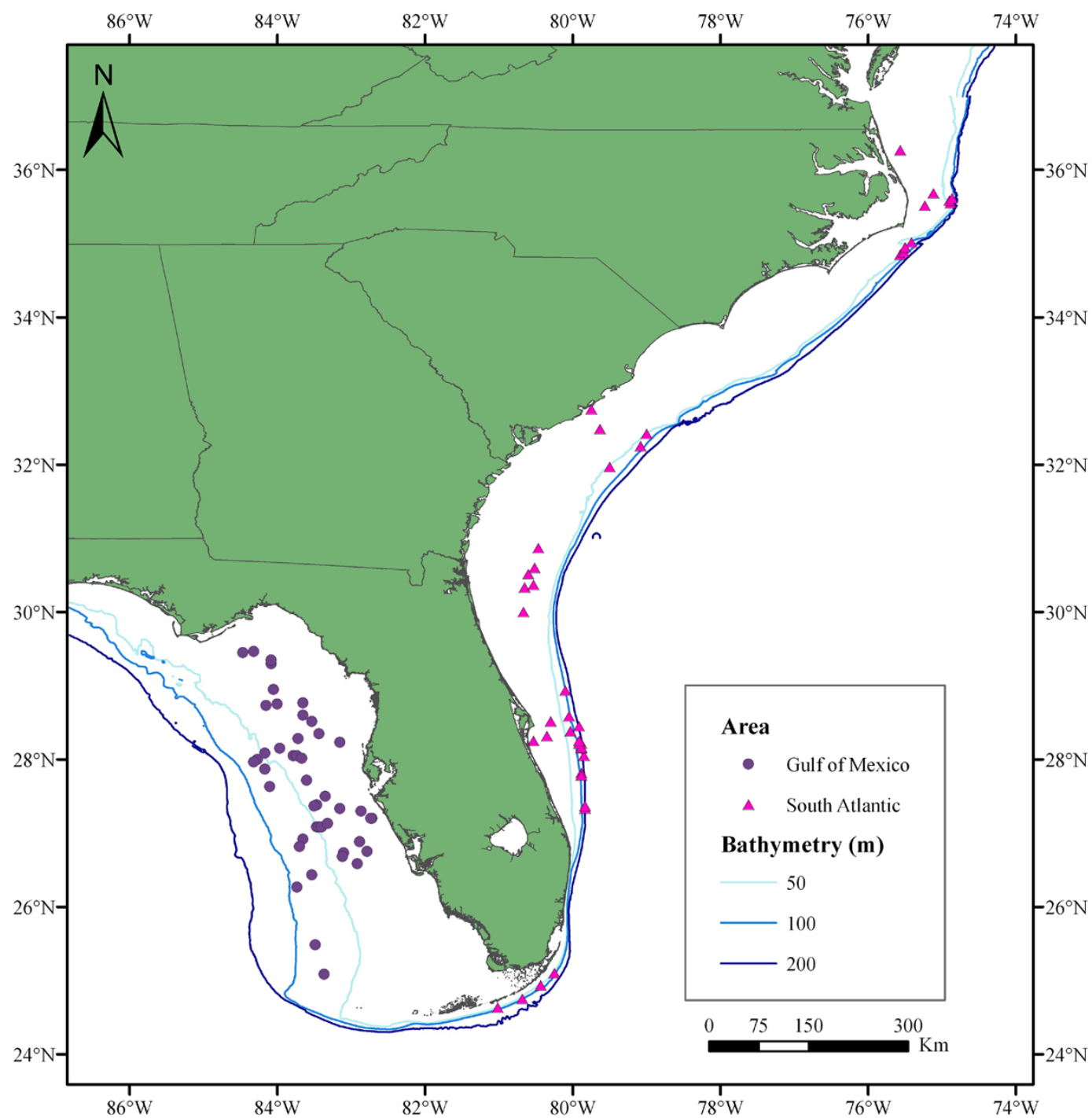
Table 5. Average size of sharks measured by number measured for all observed Gulf of Mexico bottom longline trips, 2005. N=the number of measured sharks, FL=straight fork length, SD=standard deviation.

Species	Common name	N	Average Size (cm FL)	S.D.	Percent Measured (%)
<i>Carcharhinus acronotus</i>	blacknose shark	259	91.1	10.2	81.1
<i>Carcharhinus limbatus</i>	blacktip shark	259	123.2	17.3	92.7
<i>Carcharhinus plumbeus</i>	sandbar shark	218	152.2	11.2	53.2
<i>Rhizoprionodon terranova</i>	Atlantic sharpnose shark	189	78.6	6.6	82.0
<i>Ginglymostoma cirratum</i>	nurse shark	187	-	-	0.0
<i>Galeocerdo cuvier</i>	tiger shark	64	106.3	27.1	65.6
<i>Negaprion brevirostris</i>	lemon shark	31	198.4	14.6	45.2
<i>Carcharhinus brevipinna</i>	spinner shark	31	143.5	24.1	96.8
<i>Carcharhinus leucas</i>	bull shark	28	155.9	17.9	35.7
<i>Carcharhinus falciformis</i>	silky shark	20	106.1	27.6	100.0
<i>Sphyrna mokarran</i>	great hammerhead shark	12	200.8	36.9	91.7
<i>Mustelus canis</i>	smooth dogfish shark	5	108.0	5.0	80.0
<i>Sphyrna lewini</i>	scalloped hammerhead shark	4	106.0	0.0	25.0
<i>Carcharhinus obscurus</i>	dusky shark	2	214.0	0.0	50.0
<i>Sphyrna tiburo</i>	bonnethead shark	1	66.0	0.0	100.0
Sphyrnidae	hammerhead shark family	1	360.0	0.0	100.0
Carcharhiniformes	shark order	1	-	-	0.0

Table 6. Total Gulf of Mexico bottom longline incidental catch by species and species disposition in order of decreasing abundance for all observed trips, 2005.

Species	Common Name	Total Number Caught	Discard Alive (%)	Discard Dead (%)	Unknown (%)
<i>Caretta caretta</i>	loggerhead sea turtle	3	33.3	33.3	33.3

Figure 1. Distribution of observed longline sets, 2nd and 3rd trimester seasons, 2005.



Appendix. Observer Data Forms

OBSERVER PROGRAM

LONGLINE GEAR LOG

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OBS/TRIP NUMBER	VESSEL NUMBER	VESSEL NAME	DATE LANDED mm/dd/yyyy
STRING NUMBER	NUMBER OF HOOKS	ANCHOR USED? NO _____ YES _____ WEIGHT _____ lbs	
MAINLINE COLOR _____ DIAMETER _____ mm Clear 01 _____ TEST _____ lbs White 02 _____ Pink 03 _____ Black 04 _____ MATERIAL Green 05 _____ Nylon 1 _____ Blue 06 _____ Cotton 2 _____ Multi-color 07 _____ Steel Wire 3 _____ Red 08 _____ Other 9 _____ Other 09 _____ # OF STRANDS _____		FLOATS TYPE USED? NUMBER DISTANCE NO=0 YES=1 BETWEEN Polyball _____ Bullet/Daub _____ Other _____ MAX HOOKS BETWEEN _____ RADIO BEACONS _____ RADAR REFLECTORS _____ HIGH FLIERS _____ SECTIONS _____ nm	
GANGIONS COLOR _____ DIAMETER _____ mm Clear 01 _____ TEST _____ lbs White 02 _____ Pink 03 _____ MATERIAL Black 04 _____ Nylon 1 _____ Green 05 _____ Cotton 2 _____ Blue 06 _____ Steel Wire 3 _____ Multi-color 07 _____ Other 9 _____ Red 08 _____ Other 09 _____ DISTANCE BETWEEN _____ ft		GANGION LENGTH GANGION COUNT LEADERS SWIVELS NUMBER USED? USED? SWIVELS/ NO=0, YES=1 NO=0, YES=1 GANGION #1 _____ ft _____ #2 _____ ft _____ LEADER LENGTH _____ in LEADER TEST _____ lbs LEADER MATERIAL Nylon 1 _____ Cotton 2 _____ Steel Wire 3 _____ Other 9 _____	
DROPLINES LENGTH DISTANCE BETWEEN #1 _____ ft _____ ft #2 _____ ft _____ ft #3 _____ ft _____ ft		HOOKS BRAND Circle or J / Model SIZE OFFSET NO=0, YES=1 HOOK #1 _____ / _____ / _____ HOOK #2 _____ / _____ / _____ HOOK #3 _____ / _____ / _____	
COMMENTS: NO _____ YES _____			

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1/1/2002

SBLOP INDIVIDUAL ANIMAL LOG[illegible]

Comments: No _____ Yes _____

